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Under the rays of the moon, our common trodden footpaths look phantasmal. The wonder-world of myth and faerie seems not an impossible creation, amid the illusions of moonlight, wherein the landmarks of our every-day outlook are lost. Who shall say, lingering in the spell of that glamour, that the legend of Endymion was a fable only?—

" The rising moon has hid the stars;
Her level rays, like golden bars,
Lie on the landscape green,
With shadows brown between.

" And silver white the river gleams,
As if Diana, in her dreams,
Had dropped her silver bow
Upon the meadows low."

What moonlight is by a lake-side, by the beautiful lake which the former dusky tenantry of our hills and woods poetically named "The Smile of the Great Spirit," has been outlined for us in Whittier's verses:—

" Yon mountain's side is black with night,
While, broad-orbed, o'er its gleaming crown,
The moon, slow rounding into sight,
On the hushed inland sea looks down.

" How start to light the clustering isles,
Each silver-hemmed! How sharply show
The shadows of their rocky piles
And tree-tops in the wave below!

" How far and strange the mountains seem,
Dim looming through the pale, still light!
The vague, vast grouping of a dream,
They stretch into the solemn night."

Winding streamlets, woodland pools and waterfalls, embowered roadsides, and the soft glow of moonlight upon the resting-places of the living and the dead—these are not peculiar to any country—these are to be found everywhere. But, because universal, they are not less American. And the pictures herein gathered have an interest of their own, as showing in what loving manner native singer and artist have sketched peaceful nooks and by-ways, such as the poets of all lands have delighted to wreathe about with song.

LUCY LARCOM.

THE IRON-SMITH.

I.

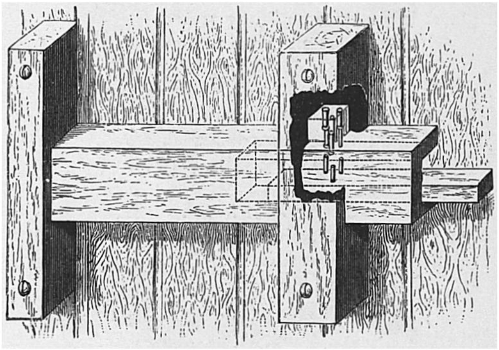
THE history of labour is the history of civilisation, the scale of the progress accomplished, and the foreshadow of all future improvement. In no other way can a thorough knowledge of our own civilisation be acquired than by looking back at the path mankind have passed over, and by examining all the footprints they have left behind. An exhibition in which the history of labour were represented by an uninterrupted series of objects, chronologically and scientifically arranged, would, we deem, bring us nearer to the solution of the puzzling problem of our origin than all the volumes of metaphysical disquisitions that have ever been printed. We deem that the usefulness of anything in this direction cannot be over-estimated; and this is why we have undertaken to illustrate the art of the smith, undoubtedly one of the most important and oldest in the world.

It is impossible to ascribe to any certain epoch and person the invention of working in metals; it dates, however, from the prehistorical times, and all the oldest mythologies have a divinity to which it was attributed. Tubal-Cain of the Hebrews, and Vulcan of the pagans, seem to be only one myth, and the reproduction of old Hindostanic traditions.

No. 1.

No. 2.

It is an accepted opinion that the art of the smith has its root in the right of property. As soon as the idea of *meum* and *tuum* entered the human mind, say the majority of writers, just so soon were the contrivances of this art called into requisition. We think, however, that its origin can be traced further back to an earlier age of the world, and to another cause. It is evident that, to provide against the attacks of wild beasts, man must have secured the entrance of the cave or hut in which he dwelt by some means or other. However rude, those manifestations of man's ingenuity foreshadow the contrivances applied later on to secure property. Wood was undoubtedly the first material employed in their construction, and very likely they were at first simple wooden bars and bolts. In fact, such is even at the present day the means by which many tribes of savages fasten their doors. Wood seems to have long filled the office of copper, brass, and iron, even among civilised nations; the *basso-rilievos* of the great Temple of Karnac prove that the Egyptians used wooden locks even when they were at the height of their civilisation. M. Bonomi actually found in the ruins of Nineveh a wooden lock which appears to have secured the gate of an apartment in one of the palaces of Khorsabad. It is the oldest lock yet discovered. "At the end of the chamber, just behind the first bulls," he says,* "was formerly a strong gate



No. 3.

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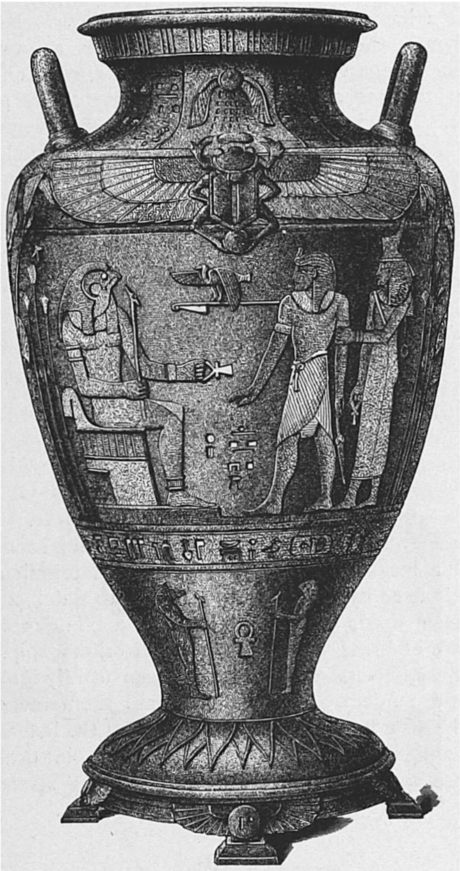
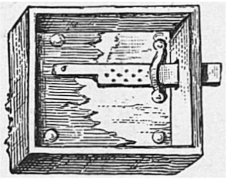
* Bonomi's "Ninive e i suoi Palazzi."

of one leaf, which was fastened by a large *wooden lock*, like those still used in the East, of which the key is as much as a man can conveniently carry, and by a bar which is moved into a square hole in the wall. It is a key of this description that the prophet probably alludes to: 'And the key of the house of David will I lay upon his shoulder.' And it is remarkable that the word key (*muphta*), in this passage of Scripture, is the same in use all over the East at the present time. The key of an ordinary street door is commonly thirteen or fourteen inches long, and the key of the gate of a public building, or of a street or quarter of a town, is two feet and more in length." Cut No. 1 shows this kind of key, and No. 2 the mode of carrying it alluded to in Isaiah, and as practised still in the East. No. 2 in fact represents a modern merchant of Cairo carrying the keys of his magazine, as given by Mr. Price in his work on locks and keys. The iron pegs at one end of the wooden key correspond to so many holes in the wooden bar or bolt of the lock, which, when the door is shut, cannot be opened till the key has been inserted, and the impediments to the drawing back of the bolt removed by raising up so many pins that fall down into holes in the bar or bolt corresponding to the pegs in the key. From a letter by W. C. Trevelyan, which appeared in the *Journal of Design and Manufactures*, for July, 1850, it appears that similar constructions are still in use in the Faroe Islands, as they have probably been for centuries.


No. 4.

Strange as it may seem, the principle on which this Egyptian lock is founded is almost identical with that of the modern lock of the most approved construction. By what process the Egyptian smiths arrived at the conception of such ingenious mechanism is unknown; at any rate, it supposes the previous existence of simpler forms, for the law that bids man pass from the simple to the complex is the ruling law of mental development, and the more we go back towards the primitive ages of the world the slower is the improvement. Of how many centuries of patient labour was this lock the result, cannot be told. In cut No. 3, which is copied from a wooden lock lately brought to England from Alexandria, and now in the possession, we believe, of Mr. Chubb, of London, we have, as nearly as can be expected, the whole secret of the modern patent locks, and we deem it not amiss to give a brief description of it.* The right-hand staple is fixed in the side of the door; the cross-piece is the bolt, the projecting piece at the right is the key. Into the upper part of the staple are fitted three loose pins, which drop into three corresponding holes in the bolt, so as to fasten the door when the bolt is pushed in to its full extent. The key is a straight piece of wood having at one end several pegs, corresponding in position with the movable pins or tumblers in the lock. This key is inserted lengthwise through the slat or hole formed in the bolt, and then the pegs in the key, corresponding with the vertical holes in the bolt, into which the movable pins have dropped, lift up the pins, flush with the upper side of the bolt, and allow it to be moved backward or forward, to fasten or unfasten the lock. Now it would appear that no other key than the one made for this lock could have disengaged the bolt; because, from the movable pins being of different lengths, it follows that the pegs in the key must have been of corresponding height, and that, if any of the pegs in the key were too long or too short, they would not free the bolt.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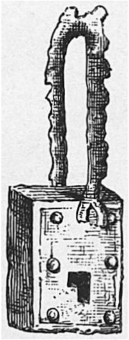
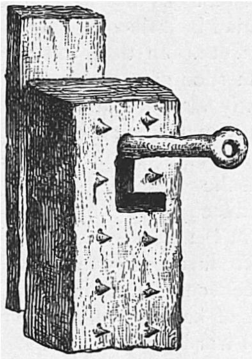

No. 6.

The Egyptians, however, appear to have at an early date applied also brass and iron to the construction of locks and keys. Wilkinson, in his "Manners and Customs of the Ancient Egyptians," describes a key made of iron, which he found in the ruins of Thebes, and which had a shank five inches long, the handle being made by a loop at one end, while the other was turned at a right angle to form the operative part of the key, which was furnished with three teeth or points, to fit into corresponding cavities in the lock.

The 'Ramses Meiamoun Vase,' which is shown in our cut No. 4, affords a further improvement of the Egyptians in key-making. King Ramses, led by the goddess Maut (Queen of the Night), receives from the god Phré (the Sun) the key of divine life, which, by-the-way, is also the key that symbolically opened the door for the waters of the Nile to flow. As the reader may see, this key resembles very closely the modern form of bitless keys. A fine reproduction of this elegant vase, by the French artist Picot, is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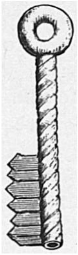
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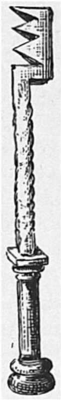
No. 9.

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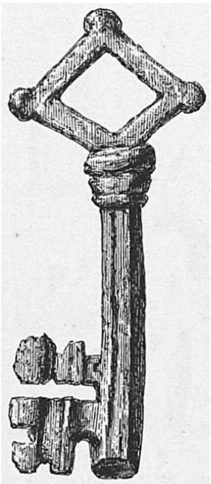
* For all mechanical explanations that may be found in this sketch, we are indebted to the kindness of Mr. Frédéric Vors.

exhibited in the Art-rooms of Messrs. Tiffany and Co., to whom we are indebted for the drawing we are able to offer.

We learn from Mr. Parkhurst's "Hebrew Lexicon," as quoted by Mr. Chubb and by Mr. Price, that certain crooked keys, having ivory or wooden handles, were used by the Hebrews and by the Greeks for the purpose of bolting or unbolting locks. Yet, before the Greeks knew anything about iron keys and locks, they fastened their doors and cabinets in a peculiar way, of which there is no record of its having ever been used by other nations. They fastened them with knots very difficult to be untied by any one but the person who had made them. In the eighth book of the "Odyssey," Ulysses is represented securing the rich presents of Alcinous and his queen, by a cord or rope fastened in a knot "closed with Circean art." This knot of Ulysses became a proverb to express an insoluble difficulty, and the Gordian knot is a proof of the estimation in which the ancients held this art, so necessary in the absence of locks.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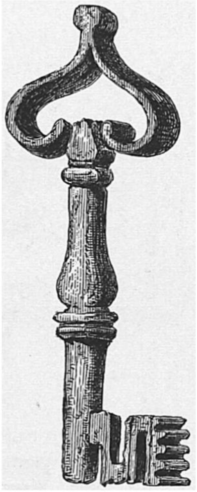
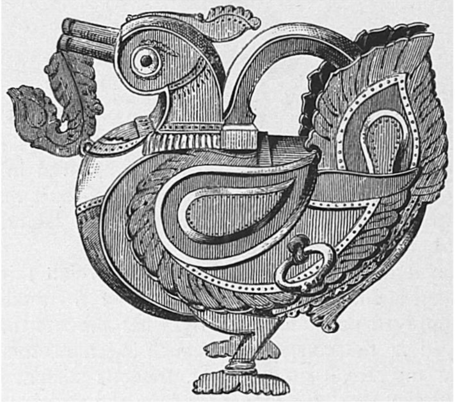

No. 11.

The locks that modern Greeks still use, particularly in the mountains, where so many of the ancient customs and traditions are preserved, seem to point to another equally primitive manner of fastening doors. These were closed from inside by a bar, either of wood or of metal, attached to the door by means of leather strings or small iron chains. The keys by which these bolts were lifted up were made in the shape of hooks or sickles, either of wood or iron. So simple were these contrivances that any hook could open nearly every door; thus the Greeks had no difficulties in robbing each other. It is easily imagined that such a state of things could not last long; and the Greek ingenuity, that was never amiss, soon provided better for the security of property. The so-called Lacedæmonian lock was invented. When Pliny and Virgil speak of Theodorus of Samos as the inventor of locks and keys, it is perhaps in reference to the Lacedæmonian lock that their words possess a certain amount of historical truth. In time this specimen of fastening was improved by the insertion of the bolt in an iron frame or rim, which was permanently attached to the door by a small chain; but such a confusion is made by all the writers in describing the manner in which this lock worked, that we have been actually unable to find out what they meant.

Keys seem not to have been reduced in size by the Greeks. Homer tells us ("Odyssey," xxi.) that Penelope, wanting to open a wardrobe, took a brass key very crooked and hafted with ivory. On this passage Eustathius, the Greek commentator of the "Sovereign Poet," remarks that this kind of key was very ancient, and differed from the keys having several wards, which have been invented since, but that they were in use even in his own time (1170). They were in the shape of sickles, and, not being easily carried in the hand on account of their size and inconvenient form, they were usually carried according to the Egyptian style. Callimachus, in his hymn to Ceres, says that the goddess having assumed the form of Nicippe, the priestess carried a key fit to be borne on the shoulder. That keys with a kind of ringed handle were known to the Greeks, is further proved by a passage of Aratus. In order to give his readers an idea of the figure of the constellation Cassiopeia, he compares it to a key, and Huetius states that the constellation answers indeed to such a description, the stars to the north composing the curved part, and those to the south the handle.

Among the nations of antiquity, lock-making made little progress in advance of what had been done by the Egyptians. Even the Romans, who excelled the other nations in iron-work, used very simple locks, which resembled those of the modern Greeks. For a long time these contrivances were not nailed to the doors, and to open them it was sufficient to insert a jack into the staple and shake it; hence Ovid wrote, "*Escute forte seram*" ("Shake the lock hard"). Varro and Nonius also speak of this kind of locks as being mere padlocks. In the excavations executed in 1853 at Pompeii, in presence of the Imperial Princess of Russia, were, however, found a number of locks and keys which are improvements on anything previously made, as will be seen in our cuts Nos. 5, 6, 7, 8, and 9. The simple construction of No. 5 announces its greater antiquity; the bolt is of brass, and was evidently intended to move up and down a staple, on the lever principle, and to close by falling in a hasp fixed in the frame of the door. No. 6 marks a step further in the art of lock-making. It is an iron padlock with a brass handle, very much corroded by age; the frame presents some attempts at carving, and is covered by a beautiful *vert-de-gris*. No. 7 is typical of a further improvement. It is no longer a padlock—it is a real lock, nailed to the boards of the door, pieces of which are still connected with the former. The bolt inside is also of hammered iron, and so is the key; applied to this bolt is what I would call "the embryo of a spring," the oldest token we have of this accessory. This lock is ornamented outside with ten brass nails, the four at the corners passing through the lock and the boards of the door, on the other side of which they are riveted. The key shown by our illustration No. 8 bespeaks that elegance which later on was to distinguish iron-works of all kinds: human ingenuity, by this time, does not satisfy itself with making contrivances to secure property; it devises ornaments for them, and endeavours to introduce such a variety in key and lock making as to render it more difficult to open locks with any other than the proper key. This specimen of key has in fact a square hole, and the surface of its shank is inlaid with silver. The house in which these and other contrivances were found seems to have been that of a locksmith. No. 9 is a faithful facsimile of an iron jack probably used by the professional man to catch all kinds of bolts, and open doors whose keys were lost. The ornaments on the handle are of brass, and show refined workmanship. The existence of these objects seems to have been utterly ignored by all writers on the subject, as we nowhere find them mentioned, yet they are to be seen in the Imperial Museum at St. Petersburg.

Next in antiquity come the warded locks in ordinary use. Whence these had their origin is unknown; they seem, however, to have been used by the Etruscans, as rude specimens of them have been found in the excavations opened on the sites where the cities of Luni and Populonia arose three thousand years ago. In the Etruscan Museum of Volterra, a wonderful collection very little

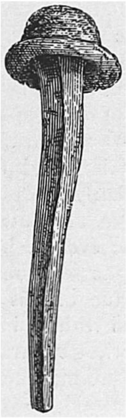

No. 11*a*.

known abroad, there are some locks of this description, which seem, however, to have never fallen under the observation of writers on iron-works. Though our researches have been diligent, we have failed to find that any but a few of the most important objects belonging to this collection have ever been illustrated, and we are therefore unable to furnish engravings of the specimens mentioned above.

The examples of Roman keys found in various part of England, and contained in the British Museum, will amply repay examination. Some of the specimens preserved at Marlborough House are not purely Roman; as cuts Nos. 10 and 11 show, they have a national character; so to speak, they are of Celtic architecture. Though the whole of them belong to the same description of lock—the warded lock—they are distinctly different. In locking and unlocking, these keys did not perform a complete revolution, and consequently they were identical with the spring locks of modern days. The Gauls, too, seem to have taken their locks from the Romans, as there is no trace of their having been acquainted with the manner of working in iron previous to the invasion of Gaul by the Romans.

Puzzle-locks have not been unknown to the less civilised nations, and their antique origin is certain. There are several known by the name of Russian, Chinese, and Hindoo puzzle-locks, some of which have the forms of various animals or birds, and they are locked and unlocked by pressing upon or moving some particular portions of their bodies. In one of the early volumes of the *Illustrated London News* the accompanying engraving (No. 11*a*) and description of one of the Hindoo locks appeared, which was so far secure in proportion to the amount of reverence felt for the god it is supposed to represent. "This curious lock," says the journal quoted, "is in the form of a bird; probably representing the Hindoo god Garuda, the carrier or bearer of Vishnu, Garuda being to Vishnu what the eagle is to Jupiter. Garuda is worshipped by the natives of Madras; and his living type, a kind of large hawk, is diligently fed by the devotees. The writer has often seen the worshippers with little baskets filled with flesh, which is thrown skilfully, a small piece at a time, into the air, while they shout 'Hari! hari!' a name of Vishnu, and the bird stoops on the wing and takes the prey. Garuda is supposed to possess human or rather divine intelligence, and is much revered. Many stories are told of his discernment and cunning; and it is probably on this account that the native artist has made his lock in the form of Garuda, a sufficient guarantee, in his notion, for its acting as a guard or detector, equal or even superior to the more mechanical and scientific inventions of the kind. We should add that in this Indian lock the key-hole is on the side, one of the wings of the bird serving as a shifting escutcheon."

We have spoken thus far only of locks and keys, for, with the exception of agricultural implements and arms which have been fully illustrated by many writers, they are, up to the Middle Ages, nearly the only iron-works of importance that antiquity has bequeathed us. Yet, among the objects belonging to the smith's trade of the old times, we cannot forbear to illustrate one with which the history of man's regeneration is strictly connected. It is one of the nails (cut No. 12) alleged to have been used in the crucifixion of Christ, preserved in the Church of *Santa Croce in Gerusalemme*, at Rome, which was founded by the mother of the Emperor Constantine on her return from a pilgrimage to Palestine.



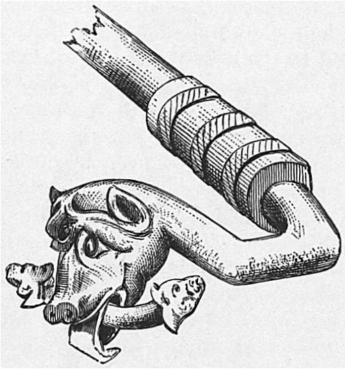
No. 12.

No. 13.

Tradition and documents assert the identity of this with one of the real nails used in the crucifixion of Christ; be this as it may, the relic dates undoubtedly as far back as the first years of Christianity.

The ravages that followed the downfall of the Roman Empire gave an unprecedented impulse to lock-making—indeed, to the art of working in iron generally. The danger of being robbed at any time was a keen spur for human ingenuity to improve the means of securing property. Painting on glass is not the only art that the Middle Ages made their own, developed and perfected to a marvellous degree; that of the smith was furthered likewise. For the security of property, locking a door became insufficient: doors were lined with iron plates or strengthened by iron bars, and even made of iron altogether; locks were applied to any piece of furniture destined to contain valuables, and these, too, were either strengthened by iron network or made of iron. Though the fact has seemingly been overlooked by the historians of safe-making, iron safes began to be built as early as the fifth century of our era. Gregory of Tours, the French Herodotus, relates in his history of France that the Emperor Justinian being dead, Justin II., his successor, full of miserly fears, "ordered his smith to construct iron coffers to keep there his thousands of gold-pieces." Fredegonde, Queen of France, wishing to revenge herself for some insult she had suffered from her daughter Rigonthe, engaged her to take anything she chose among her mother's jewels, "which were kept in an immense iron chest," says the same author. "While Rigonthe was thus bent over the open coffer, Fredegonde with unparalleled treachery caused the iron lid to fall on her daughter's head, and so she pressed on it with all her weight, that the poor girl's neck, caught between the cover and the rim of the iron box, was nearly severed from her body."

During the pagan ages labour had weighed on man as the penalty of a crime; Christianity transformed it into a glory. In the early centuries of the new religion manual labour, accomplished with resignation and courage, rose up to the level of virtue. The Middle Ages made a goldsmith bishop, several smiths archbishops, and a carpenter Pope. The saints' calendar of those times is filled with names sanctified by manual labour. Among the most celebrated of those holy men we could mention in connection with the smith's trade, we cannot omit to register the names of St. Eloi, St. Donnino, and St. Dunstan, they having, so to speak, identified themselves with their art. Eloi, afterwards Bishop of Noyon, France, was born towards the close of the sixth century, and died in 659. He brought the trade to a degree of perfection, historians say, " actually extraordinary for the time." His evangelical duties, his character of treasurer and minister to the Kings Dagobert I. and Clovis II., seem to have never interfered with his occupation as a smith, to which he clung steadfastly for all his life. Eloi became the patron of smiths in France as early as the eighth century, and no other saint ever attained greater popularity. A number of churches were consecrated to his name, and countless paintings on glass and sculptures tell the chief actions of his life. Villages and towns were called after him. His body, his clothes, his tools, were held in as much veneration as the bones of St. Remy, the cloak of St. Martin, and the pen of St. Bernard. The famous inkstand which, according to a poetical legend, the Virgin filled with her milk, and which was given by her to the holy abbot of Clairvaux to write hymns worthy of her name, has not been honoured more than the anvil on which St. Eloi hammered his iron. They went so far as to worship even the iron-dust picked up in his shop. Having worked also in gold, goldsmiths, too, acknowledge him as their patron. His life, written by St. Ouen, the Bishop of Rouen, after whom one of the most admired cathedrals of the Middle Ages was named, well reflects the legendary spirit of the period. When Eloi died, this writer tells us, Queen Batilde, Clovis's wife, tried in vain to have the body of the holy workman transferred to the abbey of Chelles, founded by her. It having been Eloi's wish to be buried in the monastery of St. Loup, in the vicinity of Soissons, "his corpse became so heavy as to render its removal impossible." Our cut No. 13 shows one of the oldest statues erected to his memory, as now preserved in the church of Notre-Dame d'Armançon, at Semur, Burgundy. Very little remains of the iron-works of this great farrier of the Middle Ages. The great chair in the form of an X, and known as the chair of Dagobert I., the possession of which has so long been a subject of dispute between the Royal Library of Paris and the Abbey of Cluny, is by tradition and old writers reckoned among the iron-works of this saint; but modern archæologists incline to believe that it is nothing else but a bronze curule chair of Roman make. It seems that Eloi only added to it the back and the arm-supports; these additions of his, however, are handsomely worked, and may be considered as the forerunners of the tasteful and skilful works which embellished the Carlovingian epoch.



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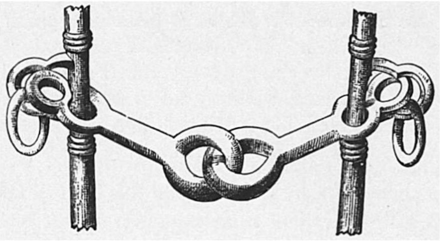
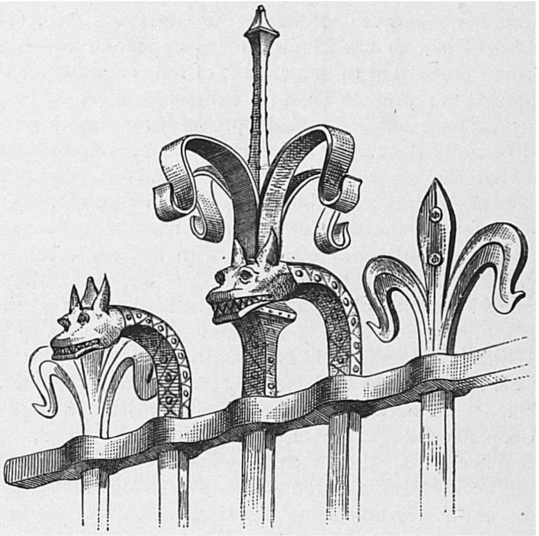


No. 15.

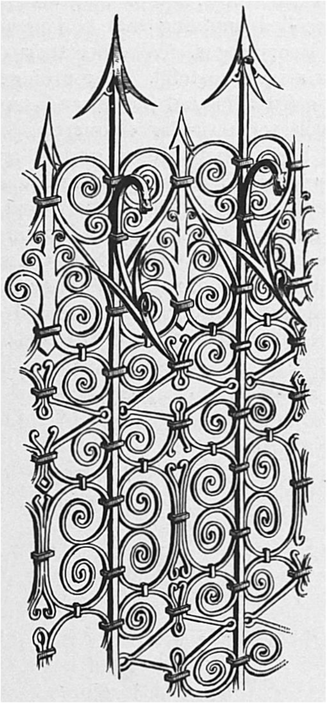
St. Dunstan, the famous Archbishop of Canterbury, and the lavish distributor of wealth to the Benedictine monks of England, who lived in the tenth century, is not less known in connection with the smith's trade. Among the many anecdotes related of him is the following: "One evening, as Dunstan was working very busily at his forge, the devil, putting on the appearance of a man, thrust his head in at the window of his cell, and asked him to make something or other for him. The farrier monk was so intent upon his work that he made no answer, upon which the devil, incensed, began to swear and talk obscenely. This betrayed the lurking fiend. But the holy locksmith was prepared for all contingencies, so he pulled his tongs, which were red-hot, out of the fire, and, seizing the devil by the nose, squeezed the satanic organ of smell with a degree of energy which caused his infernal majesty to bellow and scold at such a rate that he awakened and terrified all the people for many miles around." St. Dunstan was one of the most popular saints in England and Scotland, and the people there often swear, to the present day, by the holy smith. No authentic specimens by his hand, that we are aware of, remain in existence ; yet, all the chroniclers agree in attributing to him a great excellence of workmanship.

Italy, during the Middle Ages, was as earnest in its faith as it is now indifferent to religious belief. No wonder, therefore, that a number of saints sprang up at that time from the smith's shop. Of all of them, we shall mention only one—St. Donnino, a poor locksmith of a village in the wildest part of Tuscany, which took afterwards its name from him. He seems to be the first man who applied hot iron as a preservative against the development of hydrophobia produced by the bite of enraged animals. For the last eight hundred years the people have rushed there in crowds to be cauterised with "St. Donnino's nail;" and for the last eight hundred years the nail has not apparently worn out in the least. The simple-minded faithful, of course, attributed the fact to a miracle of the saint, rather than to the ever fresh stock of nails kept by the shrewd priest in charge of the sanctuary. But such is the effect of the confidence in the virtue of this nail, that very few of the persons who were cauterised with it have been known to die of that dreadful disease ; the priest, naturally, to maintain the reputation of the shrine, being by no means stingy in the application of the red-hot nail. Let it be said, however, to the honour of the Tuscans of the present day, that the pastor of St. Donnino does not do now the "big business" he could boast of when government as well as church had a vital interest in keeping the people in ignorance and superstition.



No. 16.

Among the iron curiosities that tradition attributes to this saint, there is a fragment of a bolt (cut No. 14), which, both for beauty of workmanship and historical associations, well deserves a place in our sketch. This bolt was formerly destined to close one of the gates of San Miniato, a city of great strategic importance during the Middle Ages, commanding, as it did, from a lofty and picturesque height, a large portion of the valley of the Arno, between the then rival cities of Florence and Pisa. The Emperor Frederick, the Red Beard, made it the seat of the Imperial Vicar, with jurisdiction over Tuscany, then nominally a province of the empire, and fortified it most powerfully. Of all its fortifications, only the main tower remains at present, which rises from the top of the mountain. It seems to defy the might of the elements and the laws of gravity, and stands loftily yet, though, on one side, hanging over the abyss, its foundation being there greatly corroded by age. Whoever has travelled over the railway that runs from Florence to Leghorn, through the valley of the Arno, cannot have forgotten the sight. In that tower, with which so many records of heroic defense are connected, Pier delle Vigne, the famous Chancellor of the Empire, and one of the most noble figures in Dante's "Inferno," was shut up by his ungrateful master; and there he, incapable of bearing with resignation Frederick's monstrous ingratitude, is said to have knocked his brains out against the walls. It is hardly needful to remark that San Miniato was constantly involved in the wars that for centuries absorbed nearly every city and castle of Italy. When it fell into the hands of the Florentines and their allies, as was the custom, San Miniato was deprived of the privilege of closing its gates, and the bolt partly represented in our illustration was given by the Florentines to the inhabitants of Empoli, a prosperous borough in the vicinity, which had been always jealous of its neighbour's glory. The bolt was carried in triumph to Empoli, and exposed to the sight of all in the town-hall, the Empolese boisterously defying their rivals to go thither if they wished to close their gates. The humiliation was more than the old Ghibelline city could bear, and repeated wars were carried on to recover the bolt on one side, to maintain the right of conquest on the other. San Miniato lost in the struggle the flower of its warriors, but succeeded in taking back only half of the bolt, it having apparently been previously broken. The other part, the one of which we give the facsimile, was not returned to its original owners until a few years ago, when the unification of Italy put an end to all the petty rivalries that tyrants had found profitable to keep alive. This bolt served as a model for many others. Viollet-le-Duc, in his excellent book, "Dictionnaire de l'Architecture," gives the illustration of the one existing in the Church of Verzenay, but seems to have utterly ignored the original.



No. 17.

The rude trade of the smith was practised even by a woman, St. Helena. Of her work as a smith a specimen is preserved as a relic at Rome, and is known by the denomination of the 'Holy Bit of Carpentras.' It was forged by that woman for the horse of the Emperor Constantine from the nails which had been driven into the holy cross, and was brought to Rome between 1204 and 1206. Our cut, No. 15, which represents it, is taken from Lacroix's "Military and Religious Life of the Middle Ages," who copied it from the engraving published by M. Rohault de Fleury in his work called "Mémoire sur les Instruments de la Passion de Notre Seigneur Jésus Christ."

During the Carlovingian epoch, the art of the smith made a step further. Iron was applied to furniture of every description, not only as a means of adding to its solidity, but as an ornament also, and it borrowed largely from the art of design. In the life of Gualdricus, Bishop of Auxerre, in Burgundy, about the year 919, is a passage in which mention is made of the iron-work in the doors of the basilica of that city, and in which it is characterised as marvellous both in design and execution. The field of this art grew wider in proportion to the new wants it was called upon to supply. Iron gates, railings and gratings, hinges, door-knockers, and scores of new objects, were made by the smith; locks and keys were reduced in size, made handier, and improved in every detail.

No. 18.

"At that time," says Labarte, in his history of Arts, "smiths were not assisted in their work by the powerful mechanical contrivances which nowadays furnish them with iron shaped into bars and extended in plates of every thickness. The farrier was obliged to make everything by hand, and prepare by himself the materials for the work to be executed." The difficulties with which the workmen of the Middle Ages had to contend cannot be justly appreciated by us, accustomed as we are to see the iron delivered to our smiths already shaped according to their wants. Yet this evil was not devoid of beneficial effects. "Although the immense advantages of the mechanical preparation of iron are not to be denied," says Viollet-le-Duc in his " Dictionary of Architecture," " it is certain, however, that the smiths of that time acquired the habit of handling the iron at will, and became thoroughly acquainted with its qualities. Up to twenty-five years ago, since the application of mechanics to the preparation of iron, a workman capable of making by hand the simplest grate, as in the old times, would have been sought for in vain; and, if any is now to be found, we are indebted for the finding to the new impulse given to the trade by the researches made in late years in the industrial arts of the Middle Ages." In this statement are epitomised the causes of the excellence of those iron-workers. Grates, railings, &c., of the eleventh and the twelfth centuries are still in existence, which bear witness to their skill. These works deserve more than a passing notice; their lines were interlaced in attractive designs; the wrought stems were delicately lengthened out at once strong and light, and expanded with natural grace into leaves, fruits, and symbolic figures. M. Dideron has published some of these old gratings in his " Archæological Annals" that are actually masterpieces of workmanship. Yet, however skilful, the French artisans were excelled by the Italians, as a comparison between the typical specimens afforded by our cuts, Nos. 16 and 17, will readily show. The Italians often introduced allegorical figures in their works that well expressed the purpose of the object they ornamented. Nothing, we deem, can be more appropriate to a railing surrounding a garden than the dog-heads that are seen in our illustration No. 16. But the work in which the smiths, both of Italy and France, in the thirteenth century excelled anything that had been done so far, was the fabrication of door-hinges. Whether their design was simple or rich, they were always tasteful. These hinges were formed of branches springing from foliated bands, and separated from each other by scroll-work of a similar character. These enrichments are composed of birds, lizards, roses, grapes, and different kinds of foliage, employed with a degree of profusion and chased with an amount of delicacy calculated to show that their cost was a matter of but little consideration. Most famous among the works of this description are the hinges which decorate the doors of Notre-Dame of Paris (cut No. 18). The following ages, astonished at so much excellence of workmanship, could do no better than to attribute them to the intervention of the devil.

MAURICE MAURIS.

[*To be continued.*]

AUTOTYPE AND ITS RELATION TO ART.

FOR about ten years a process of photographic printing yclept "autotype" has been growing into notice, and asserting its right to occupy the field of Art Photography. It not only claims to have solved the problem of rendering the photographic image inalterable, but by the command of a wide range of monochromic effect, and of different surfaces for the reception of the picture, to have rendered practicable the reproduction of an artist's work in fac-simile. For example, an artist expresses his ideas in charcoal, in crayon, in sepia, or red chalk; the process is able to replicate his work, the same size, or larger, or smaller, employing the pigment of the original and the same kind of paper or foundation. The copy in such case may reasonably be believed to be as permanent as the original. A drawing or other artistic work reproduced by ordinary photographic means is palpably but a photograph: printed in autotype it will be so close a fac-simile of the original as not easily to be distinguished from it.

The autotype thus claims under favourable circumstances to reproduce the very body and soul of an artist's work—his touch and sentiment, with the actual pigment of his palette and the material he works upon. Effecting this by chemical means without the intervention of another hand, the process found a sponsor to name it Autotype.

The starting-point of all photographic pictures is the production of a negative in the camera. The negative becomes a matrix of endless prints. Most of our readers are familiar with a negative, and have noticed how the lights and shadows of the image on the glass are reversed; the high lights of the subject being represented by a dense deposit, while its shadows approach the condition of clear glass. It follows that light will be retarded in its passage through a negative exactly in proportion to the varying density of the image on its surface, and the art of photographic printing consists in providing that the transmitted light shall impinge on a surface sensitive to its impression. This has hitherto been effected by the use of a paper coated with a thin stratum of albumen and rendered sensitive to light by a salt of silver. Photographs so produced are liable to gradual spontaneous decay, and fade away to the pale ghosts of their former selves, and ultimately disappear.

Autotypy claims permanency for its *raison d'être*. The difference it imports into photographic printing consists principally in substituting for the fickle salts of silver some permanent pigment as the physical basis of the picture. This substitution not only supplants the evanescent by what is practically inalterable, but endows photographic Art with the wide range of monochromic effect. Photography in natural colours is still a dream, but autotypy is able to make some slight advance towards Art in this direction. The process is founded on the property of gelatine when combined with a bichromate salt to become insoluble in water after having been exposed to light. Paper is coated with a film of liquid gelatine containing finely ground colour and sufficient of the bichromate salt to insure chemical action. This sensitive tissue, kept from the light, is perfectly soluble in water; but if light acts upon it the whole condition is altered: the gelatine becomes insoluble, and firmly imprisons every particle of the colouring matter. It will now be understood that if this sensitive tissue be placed under a negative and exposed to light, the chemical action exerted upon it will be in proportion to the density of the negative; where much light passes, the tissue will be deeply penetrated and much colour imprisoned; where the light is partially intercepted less colour will be fixed, and a latent picture will be formed in the tissue in exact gradation, and with the lights and shadows as in nature.

To make this latent picture visible, it is, in technical language, "developed" by the action of warm water, washing away such portions of the coloured gelatine film as have not been influenced by light. But effective development is only possible by an ingenious operation known as "transfer." The impact of light through the negative on the surface of the tissue has rendered that surface insoluble, and to achieve success the pictorial film must be attacked at the *back*, that is, at the surface resting on its paper support. The various methods of effecting this constitute an important part of the autotype patents.

The sensitive tissue which under the negative becomes fecundated by light is called the "temporary support," and the surface of this is made to adhere by pressure to the material on which the picture shall finally remain. This "permanent support" may be drawing-paper, canvas, panel, ivory, or, in fact, almost any material used by artists. The two adhering supports are immersed in warm water, which softens the gelatine, and allows the original paper or temporary support to be peeled off, and thus lays bare to the action of the water all the pigmented gelatine unaffected by the light. Under the solvent action of water the picture gradually appears and remains firmly adherent to its support. The lights and shades of this picture are built up by various degrees of thickness in the gelatine and pigment, representing exactly the gradations of density of the original negative and the consequent modifications of the action of light. The developed pictures, after being immersed in a solution of alum, washed in pure water, and hung up to dry, are trimmed and mounted in the usual way. Such photographic pictures consist of particles of pigment held together by an incredibly thin film of gelatine, rendered insoluble by chemical agency.